

Miniature DC Photoelectric Switches QB

IMO

Miniature photoelectric switches for DC operation

- Models with IR, red light and red light LASER emission
- Red light emission for transparent object detection
- Digital "Teach In" sensitivity adjustment
- Position sensor with analogue output
- Contrast detection model
- UL and CUL approved
- IP67 protection



Options and ordering codes

| | | | | | | | | |
|---|----------|----------|---|----------|----------|----------|----------|--------------------------|
| QB | I | 6 | / | 0 | P | - | 0 | E |
| Infrared emission | I | | | | | | | |
| Visible red LED emission | R | | | | | | | |
| Red LASER diode emission | L | | | | | | | |
| Diffuse 300mm with sensitivity adjustment (R) | | 6 | | | P | | 0 | E |
| Background Suppression 60mm (L) | | | | | N | | | M8 axial plug connection |
| Background Suppression 100mm (R) | | | | | O | | | Plastic housing |
| Background Suppression 110mm (L) | | | | | A | | | |
| Background Suppression 150mm (I) | | | | 0 | P | | | |
| Background + Foreground Suppression (R) | | | | | N | | | |
| Diffuse Contrast (L) | | | | | O | | | |
| Fibre Optic (R) | | | | | A | | | |
| Retro-reflective for clear material detection (R) | | | | | | | | |
| Retro-reflective 1m (L) | | | | | | | | |
| Retro-reflective 2.5m (R) | | | | | | | | |
| Retro-reflective 4m (R) | | | | | | | | |
| Receiver 6m | | | | | | | | |
| Emitter (R) | | | | | | | | |

Diffuse 300mm with sensitivity adjustment (R) Background Suppression 60mm (L) Background Suppression 100mm (R) Background Suppression 110mm (L) Background Suppression 150mm (I) Background + Foreground Suppression (R) Diffuse Contrast (L) Fibre Optic (R) Retro-reflective for clear material detection (R) Retro-reflective 1m (L) Retro-reflective 2.5m (R) Retro-reflective 4m (R) Receiver 6m Emitter (R)

Emitter or 4 wire, LOn/DOn selectable

Note: Some model combinations are not available, please refer to "Available models" section of this data sheet.

Specification common to all models

| | |
|------------------------------|--|
| Operating voltage | 10-30Vdc (QBR3 15-30Vdc) |
| Load current | 100mA (not emitters) |
| Leakage current | $\leq 10\text{mA}$ at V_{max} (not emitters) |
| Switching Frequency | 1kHz |
| Sensitivity adjustment | Push button & External connection |
| Red Light Emission | 660 Nm, Pulsed |
| Infrared Emission | 880 Nm, Pulsed |
| Laser Emission | 650 Nm, Class II |
| Current consumption | See Model tables |
| Indicators | Yellow LED (Output), Green LED (signal strength) |
| Supply electrical protection | Polarity reversal and transient $U_{imp} = 500\text{V}$ |
| Output electrical protection | Short circuit (auto-reset) and over-voltage |
| Protection | IP67 (EN60529) |
| Housing material | ABS |
| Storage temperature | -20° to 80°C |
| Operating temperature | -20° to 60°C |
| Weight | 40g (approx) |

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continued

Specification

| | Diffuse models | | | |
|----------------------------------|------------------------------|------------|----------------------|------------|
| | QBR6/OP-0E | QBR6/ON-0E | QBLL/OP-0E | QBLL/ON-0E |
| Sensing distance | 300mm | | 150mm | |
| Light source | Red LED 660nm | | Laser 650nm Class II | |
| Switching frequency (Hz) | 1000 | | 4000 | |
| Output type | PNP | NPN | PNP | NPN |
| Output function | N/O,N/C selectable | | | |
| Current consumption no load (mA) | 35 | | 25 | |
| Max. output current (mA) | | 100 | | |
| Max. output voltage drop (V) | | 2.4 | | |
| Time delay (ms) | | 300 | | |
| Operating indicator | LED green | | | |
| Output indicator | LED red | | | |
| Light spot at 160mm | 12 x 12mm | | <0.7mm | |
| Reference material | Kodak White 90%, 100 x 100mm | | | |

| | Background suppression models | | | |
|----------------------------------|-------------------------------|------------|---------------|------------|
| | QBLA/OP-0E | QBLA/ON-0E | QBLC/OP-0E | QBLC/ON-0E |
| Sensing distance | 60mm | | 110m | |
| Light source | Laser 650nm | | | |
| Switching frequency (Hz) | 1000 | | | |
| Output type | PNP | NPN | PNP | NPN |
| Output function | N/O,N/C selectable | | | |
| Current consumption no load (mA) | < 30 | | | |
| Max. output current (mA) | 100 | | | |
| LASER protection class | II | | | |
| Light spot | <0.3mm at 40mm | | 0.7mm at 85mm | |
| Max. Grey scale displacement (%) | 7 | | | |
| Operating indicator | LED green | | | |
| Output indicator | LED red | | | |
| Reference material | Kodak Grey 18%, 100 x 100mm | | | |

| | Background suppression models | | | | |
|-----------------------------------|-------------------------------|------------|---------------|------------|-----------------|
| | QBID/OP-0E | QBID/ON-0E | QBRB/OP-0E | QBRB/ON-0E | QBR3/0A-0E |
| Sensing distance | 150mm | | 100mm | | 80mm |
| Light source | IR 880nm | | Red LED 660nm | | |
| Switching frequency (Hz) | 800 | | 1000 | | 200 |
| Output type | PNP | NPN | PNP | NPN | 0 - 10Vdc |
| Output function | N/O,N/C selectable | | | | |
| Current consumption no load (mA) | 25 | | 35 | | 25 |
| Max. output current (mA) | | 100 | | | - |
| Max. output voltage drop (V) | | 2.4 | | | - |
| Max. Grey scale displacement (%) | | 10 | | | - |
| Operating indicator | LED green | | | | |
| Output indicator | LED red | | | | |
| Light spot | 5 x 5mm at 60mm | | | | |
| Reference material, 100mm x 100mm | Kodak grey 18% | | | | Kodak White 90% |

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continued

Specification

| | Clear Material | | Retro-reflective | | | |
|----------------------------------|--------------------|------------|------------------|----------------------|--|--|
| | QBRG/OP-0E | QBRG/ON-0E | QBLM/OP-0E | QBLM/ON-0E | | |
| Sensing distance | 500mm | | | 1m | | |
| Light source | Red LED 660nm | | | LASER 650nm Class II | | |
| Switching frequency (Hz) | 1000 | | | 4000 | | |
| Output type | PNP | NPN | PNP | NPN | | |
| Output function | N/O,N/C selectable | | | | | |
| Current consumption no load (mA) | 35 | | 25 | | | |
| Max. output current (mA) | 100 | | | | | |
| Max. output voltage drop (V) | 2.4 | | | | | |
| Operating indicator | LED green | | | | | |
| Output indicator | LED red | | | | | |
| Light spot | 12 x 12mm at 160mm | | 1mm at 300mm | | | |
| Reference material | Reflector RL113G | | | | | |

| | Retro-reflective | | | | | |
|----------------------------------|--------------------|------------|------------|------------|--|--|
| | QBRN/OP-0E | QBRN/ON-0E | QBRP/OP-0E | QBRP/ON-0E | | |
| Sensing distance | 2.5m | | | 3.5m | | |
| Light source | Red LED 660nm | | | | | |
| Switching frequency (Hz) | 1000 | | | | | |
| Output type | PNP | NPN | PNP | NPN | | |
| Output function | N/O,N/C selectable | | | | | |
| Current consumption no load (mA) | 35 | | | | | |
| Max. output current (mA) | 100 | | | | | |
| Max. output voltage drop (V) | 2.4 | | | | | |
| Light spot at 2m | 75 x 75mm | | | | | |
| Max. distance | 3m | | 4m | | | |
| Operating indicator | LED green | | | | | |
| Output indicator | LED red | | | | | |
| Reference material | Reflector RL113G | | | | | |

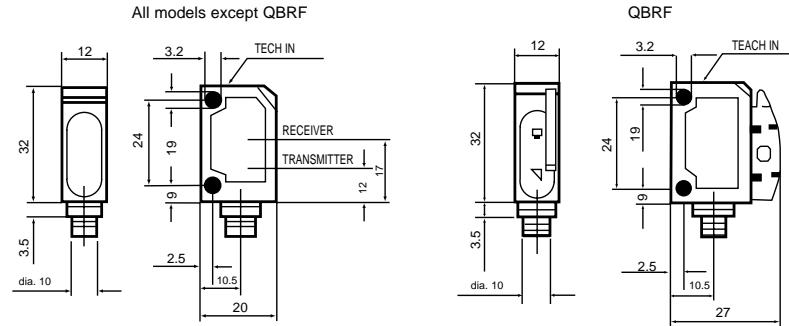
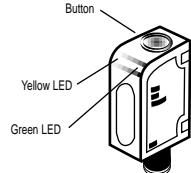
| | Through beam | | | Fibre optic | | | | | | | |
|----------------------------------|--------------|--------------------|------------|-----------------|------------|--|--|--|--|--|--|
| | QBRS/00-0E | QBRR/OP-0E | QBRR/ON-0E | QBRF/OP-0E | QBRF/ON-0E | | | | | | |
| Sensing distance | - | 6m | | 100mm (typical) | | | | | | | |
| Light source | LED 660nm | - | | Red LED 660nm | | | | | | | |
| Switching frequency (Hz) | - | 500 | | 1000 | | | | | | | |
| Output type | - | PNP | NPN | PNP | NPN | | | | | | |
| Output function | - | N/O,N/C selectable | | | | | | | | | |
| Current consumption no load (mA) | 20 | 25 | | 25 | | | | | | | |
| Max. output current (mA) | - | 100 | | 100 | | | | | | | |
| Max. output voltage drop (V) | - | 2.4 | | | | | | | | | |
| Ripple | 10% | | | | | | | | | | |
| Operating indicator | LED green | | | | | | | | | | |
| Output indicator | - | LED red | | - | | | | | | | |
| Max. beam angle (°) | 6 | | - | | - | | | | | | |
| Contamination indicator | - | Yes | | | | | | | | | |

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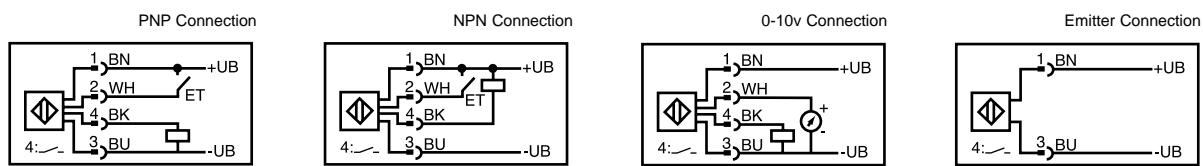
continued



Dimensions (mm)



Connections



Available Models

| Part Number | Function | Range | Light Source | Output | Connection |
|-------------|---------------------------------------|-------|--------------------|----------|------------|
| QBL/OP-0E | Diffuse, Contrast | 150mm | LASER 650nm | PNP | M8 |
| QBL/ON-0E | Diffuse, Contrast | 150mm | LASER 650nm | NPN | M8 |
| QBR/OP-0E | Diffuse | 300mm | Red LED 660nm | PNP | M8 |
| QBR/ON-0E | Diffuse | 300mm | Red LED 660nm | NPN | M8 |
| QBLA/OP-0E | Background Suppression | 60mm | LASER 650nm | PNP | M8 |
| QBLA/ON-0E | Background Suppression | 60mm | LASER 650nm | NPN | M8 |
| QBRB/OP-0E | Background Suppression | 100mm | Red LED 660nm | PNP | M8 |
| QBRB/ON-0E | Background Suppression | 100mm | Red LED 660nm | NPN | M8 |
| QBLC/OP-0E | Background Suppression | 110mm | LASER 650nm | PNP | M8 |
| QBLC/ON-0E | Background Suppression | 110mm | LASER 650nm | NPN | M8 |
| QBID/OP-0E | Background Suppression | 150mm | Infrared LED 880nm | PNP | M8 |
| QBID/ON-0E | Background Suppression | 150mm | Infrared LED 880nm | NPN | M8 |
| QBR3/0A-0E | Background / Foreground Suppression | 80mm | Red LED 660nm | 0-10 Vdc | M8 |
| QBRG/OP-0E | Retro-reflective, Transparent Objects | 500mm | Red LED 660nm | PNP | M8 |
| QBRG/ON-0E | Retro-reflective, Transparent Objects | 500mm | Red LED 660nm | NPN | M8 |
| QBLM/OP-0E | Retro-reflective | 1m | LASER 650nm | PNP | M8 |
| QBLM/ON-0E | Retro-reflective | 1m | LASER 650nm | NPN | M8 |
| QBRN/OP-0E | Retro-reflective | 2.5m | Red LED 660nm | PNP | M8 |
| QBRN/ON-0E | Retro-reflective | 2.5m | Red LED 660nm | NPN | M8 |
| QBRP/OP-0E | Retro-reflective | 4m | Red LED 660nm | PNP | M8 |
| QBRP/ON-0E | Retro-reflective | 4m | Red LED 660nm | NPN | M8 |
| QBRS/00-0E | Through beam emitter | - | Red LED 660nm | - | M8 |
| QBRR/OP-0E | Through beam receiver | 6m | Red LED 660nm | PNP | M8 |
| QBRR/ON-0E | Through beam receiver | 6m | Red LED 660nm | NPN | M8 |
| QBRF/OP-0E | Fibre optic amplifier | - | Red LED 660nm | PNP | M8 |
| QBRF/ON-0E | Fibre optic amplifier | - | Red LED 660nm | NPN | M8 |